Remarks

The office action mailed July 12, 2006 has been carefully reviewed and these remarks are responsive thereto. Claims 1-14, 17-37 and 39-43 are pending. Claims 11, 42 and 43 are objected to as dependent on rejected base claims, but have been indicated as allowable if rewritten in independent form. Claims 1-10, 12-14, 17-37 and 38-41 are rejected.

In a telephone conference on September 8, 2006, Examiner Opsasnick confirmed that all claim amendments submitted through April 25, 2006 have been entered.

Claims 1-10, 20, 30 and 31

The office action rejects claims 1-10, 20, 30 and 31 under 35 U.S.C. § 103 based on U.S. Patent 5,394,473 (Davidson) in view of U.S. Patent 6,766,300 (Laroche). Applicant respectfully traverses, as the office has failed to establish a motivation for combining teachings from these two references. Claim 1 recites analyzing transform coefficients of a sequence of encoded audio data intervals so as to identify encoded transient audio data intervals. Davidson fails to teach this feature, and instead describes detection of transients prior to generation of transform coefficients. The office action acknowledges at page 7 that Davidson is lacking in this regard.

The office action attempts to overcome this deficiency in Davidson by adding features of Laroche. According to the office action, "it would have been obvious to one of ordinary skill in the art of transient detection to modify the structure of Davidson (5394473) to move the transient detector to operate on frequency representations of the original signal because it would advantageously remove the problem of tempo-modulation that occurs when performing transient analysis in the time domain. (Laroche, col. 2 lines 7-15)." However, this purported motivation relies on an incorrect reading of Laroche.

Laroche does not teach that tempo-modulation occurs when performing transient analysis in the time domain. Instead, Laroche indicates that tempo-modulation occurs in connection with time domain ***time-scaling*** techniques:

> For time-domain time scaling techniques, one problem that needed to be solved is the following: time-domain time-scaling systems rely on the very simple idea of repeating (respectively, discarding) segments of the original audio to increase (respectively, decrease) its duration without altering its pitch, a process known as "splicing." When the segments are of an appropriate duration and the splice points are appropriately chosen, the operation of repeating or discarding audio segments can be made relatively inconspicuous, at least for moderate (15%) modification factors. However, two kinds of artifacts are particularly troublesome and difficult to avoid: tempo-modulation and transient-repeating/discarding.

Laroche col. 1, lines 35-47. The portion of Laroche cited by the office action does not indicate any advantage of "frequency domain techniques" in the absence of time-scaling. Indeed, the first sentence of that cited portion states that "frequency-domain techniques do not exhibit the problem of tempo-modulation ***because the time-scaling operation*** is uniformly distributed along the duration of the signal (as opposed to lumped at certain splicing-instants in time-domain techniques)." Laroche col. 2, lines 7-11 (emphasis added).

The primary reference (Davidson) does not teach or suggest that time scaling will be performed in a Davidson device. If there is no teaching that timescaling will be performed by a Davidson device, and if the advantage touted by Laroche (and relied on by the office action) pertains to time-scaling, the office has failed to provide a motivation for a person of skill in the art to have modified Davidson based on Laroche.

Moreover, modifying Davidson to search for transients in the frequency domain would change the principle of operation of the Davidson device. Accordingly, and as set forth in MPEP § 2143.01 VI. (titled "The Proposed Modification Cannot Change the Principle of Operation of a Reference"), the office has not established prima facie obviousness. In particular, Davidson teaches detection of transients before generation of frequency domain transform coefficients so that an appropriate block length can be chosen. Davidson col. 10, lines 25-52. Davidson indicates that sample block lengths are relevant to transform encoding because "quantization errors will cause a discrete transform coder to smear spectral components of transient signals throughout the signal sample block interval." Col. 22, lines 7-10. Davidson describes subdividing these blocks in order to minimize the distortion resulting from such smearing: "[t]he transient detector may select higher temporal resolution in exchange for poorer transform filter

bank selectivity by adaptively selecting a shorter block length when it determines that a shorter block is required to insure temporal psychoacoustic masking of transient signal distortion artifacts." Col. 22, lines 24-29. If a transform coder is to use shorter block lengths when encoding transients, those transients must presumably be identified ***before*** such encoding is performed. In other words, if Davidson were to identify transients by analysis of transform coefficients (which are not available until after transform encoding), the block lengths would already have been chosen, thereby subverting Davidson's goal of choosing block size based on the presence of a transient.

For at least the above reasons, the office action has not established a motivation for a person of skill in the art to have modified Davidson based on Laroche. Claims 9-10, 30 and 31 depend from claim 1, and are therefore allowable for at least the same reasons as claim 1.

Claim 20 recites an encoder for transform encoding a sequence of audio data intervals, as well as a transient detector for identifying, by analysis of the frequency domain transfer coefficients of the coded audio data intervals, at least one of the coded audio data intervals corresponding to an audio data interval having a short transient signal. Accordingly, claim 20 is allowable for reasons similar to those set forth with regard to claim 1.

Claim 12[1]

The office action rejected independent claim 12 under 35 U.S.C. § 102(e) based on U.S. Patent 6,597,961 (Cooke). Cooke fails to teach or suggest all features of claim 12. In particular, claim 12 recites the step of "replacing transform coefficients of the defective transient intervals with transform coefficients from received transient intervals not identified as defective." In other words, claim 12 recites taking the actual coefficients from certain intervals and using those actual coefficients in defective intervals ("replacing transform coefficients ... with coefficients from received intervals").

[1] The rejections of claims 12-14, 17-19, 21-29, 32-37 and 39-41in the present office action appear to be verbatim copies of the same rejections from the December 27, 2005 office action. In response to arguments and amendments submitted by Applicant on March 8, 2006, the office indicated (in an Advisory Action mailed April 4, 2006) that all of these claims were allowable. The present office action does not rely on any newly identified prior art in rejecting these claims, does not address the arguments from Applicant's March 8, 2006 Amendment, and does not otherwise offer any explanation. During the above-mentioned September 8, 2006 telephone conference, Examiner Opsasnick suggested that Applicant could resubmit the aforementioned arguments from the March 8, 2006 Amendment. Accordingly, Applicant is doing so.

Cooke teaches generating "synthetic" frames by interpolation. This is not the same as the replacing step of claim 12. In other words, claim 12 recites taking the actual coefficients from certain intervals and using those actual coefficients in defective intervals ("replacing transform coefficients ... with coefficients from received intervals ..."). Cooke requires, e.g., summing samples from previous and next frames and dividing by 2 (see col. 8, lines 35-41) or multiplying samples in a previous (or next) frame by 0.75 (see col. 9, lines 8-25).

The office previously asserted the following at page 13 of the December 27, 2005 office action:

> As per applicant's arguments that Cooke does not teach the recited limitations pertaining to the type of coefficient transform replacement, examiner argues that the replacement is a representation of non-defective interpolated information.

If the office is maintaining this position, Applicant respectfully submits that this position ignores the clear language of claim 12.

Claims 13, 14, 17-19 and 32-36

The office action also rejected claims 13, 14, 17-19 and 42-36 under § 102(e) based on Cooke. These claims depend from claim 12 and are allowable for at least the same reasons as claim 12, as well as because of other features recited in these claims. For example, claim 19 recites that step (d) comprises, as to each of the defective transient intervals,

> (d1) matching a window type of the defective transient interval with a window type of a received transient interval not identified as defective, and
>
> (d2) replacing transform coefficients of the defective transient interval with transform coefficients from the matching received non-defective transient interval.

Cooke simply does not teach this. The office action cites to Cooke col. 5, lines 60-64, and refers to "matching the bit field with a predetermined value associated with the transform that was used during the encoding process ... that is, the bit field pattern contains information as to which transform was used, and the corresponding transform is executed on the decoding end[.]" Office action at page 9. Even if one were to argue that Cooke teaches reading a bit field in an audio frame to identify the type of transform used, this has nothing to do with the way in which the Cooke system corrects for lost frames. When there is a "lost frame," the Cooke

system does not generate a replacement frame based on a window type (or other characteristic) of that lost frame. Instead, the Cooke system evaluates characteristics of the frames before and after the lost frame. See Cooke Fig. 9 and corresponding description. For example, a lost frame may or may not correspond to audio data having a transient. In either case, however, the interpolation used to generate a "synthetic" frame is based on whether or not there is a transient in the next and/or in the preceding frame.

Claim 32 recites that step (d) comprises, as to each of the defective transient intervals,

(d1) matching the beat type of the defective transient interval with the beat type of a non-defective received transient interval, and

(d2) replacing transform coefficients of the defective transient interval with transform coefficients from the matching non-defective received transient interval.

As indicated above, the Cooke system does not generate a replacement frame based on a beat type (or other characteristic) of a lost frame. Instead, the Cooke system evaluates characteristics of the frames before and after the lost frame.

Claim 35 recites, as to each of the defective transient intervals,

(e1) inversely transforming the mid-frequency band replaced coefficients to a time domain component,

(e2) inversely transforming the low-frequency and high-frequency band replaced coefficients to a time domain component, and

(e3) constructing a replacement signal in the time domain corresponding to the defective transient interval by weighting and combining the time domain components of steps (e1) and (e2).

Cooke does not teach these features. Although Cooke does refer to detecting transients based on time domain samples of decoded audio frame data, Cooke does not describe constructing a replacement signal by weighting and combining those time domain components. Any weighting performed as part of the Cooke interpolation process occurs in the *frequency* domain. See col. 4, lines 28-41 (indicating that contents of frame buffers are "frequency domain samples").

Claims 21, 22, 37 and 39-41

The office action rejected independent claim 21 under § 102(e) based on Cooke. Claim 21 recites matching a window type of the defective transient interval and replacing transform coefficients of the defective transient interval with transform coefficients from the matching non-defective received transient interval. As set forth above in connection with claim 19, Cooke does not teach this feature.

Claims 22 and 37 depend from claim 21 and are thus allowable for at least the same reasons as claim 21.

Claims 39 and 40 each recites matching the beat type of the defective transient interval and replacing transform coefficients of the defective transient interval with transform coefficients from the matching non-defective received transient interval. As set forth above in connection with claim 32, Cooke does not teach this feature.

Claim 41 recites, as to each of the defective transient intervals,

> (e1) replacing transform coefficients for a low-frequency band and for a high-frequency band with transform coefficients from a received transient interval not identified as defective, and
>
> (e2) replacing transform coefficients for a mid-frequency band with transform coefficients from a received interval other than the interval supplying the replacement coefficients in step (e1).

Cooke does not teach this combination of features, and the office action has not pointed to a portion of Cooke teaching this aspect of claim 41.

Claims 23-29

The office action rejected independent claim 23 and its dependent claims 24, 28 and 29 under 35 U.S.C. § 103 based on Davidson in view of Cooke. Claim 23 recites, e.g., a receiving terminal that includes "an error concealment unit for replacing frequency domain transform coefficients of a defective transient audio data interval with frequency domain transform coefficients from a received transient audio data interval found to be error-free." As set forth above in connection with claim 12, such a feature is not taught by Cooke. This feature is also not taught by Davidson. For at least this reason, claim 23 is allowable over Cooke and Davidson (either alone or in combination as proposed by the office action). Claims 28 and 29 depend from claim 23, and are thus also allowable.

The office action rejected claims 25-27 under § 103 based on Davidson in view of Cooke and U.S. Patent 6,477,150 (Maggenti et al., hereinafter "Maggenti"). Applicant has not found (and the office action has not identified) a teaching in Maggenti of "an error concealment unit for replacing frequency domain transform coefficients of a defective transient audio data interval with frequency domain transform coefficients from a received transient audio data interval found to be error-free." Accordingly, claims 25-27 are also allowable over Cooke, Davidson and Maggenti (either alone or in combination as proposed by the office action).

Conclusion

It is respectfully submitted that this application is in condition for allowance. Should the Examiner believe that anything further is desirable in order to place the application in even better form for allowance, the Examiner is invited to contact Applicant's undersigned representative at the below-listed number.

Respectfully submitted,

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